

DEQ Recommendations for Discussion with TAC Six Issues Carried-Over From Triennial Review

[6/12/09]

1. **Ammonia (freshwater criteria):** The committee considered the need for revising Virginia's water quality criteria for ammonia in freshwater based on data from recent toxicity studies on early life stages of freshwater mussels that have demonstrated adverse effects at concentrations allowed for by the current water quality criteria.

DEQ Recommendation: DEQ expects that changes to the Virginia criteria for ammonia will be warranted after EPA provides their reassessment of the EPA ammonia criteria document. EPA is scheduled to issue a draft reassessment of their ammonia criteria in the fall of 2009.

2. **Copper (freshwater criteria):** The committee considered the need for revising Virginia's water quality criteria for copper in freshwater based on data from recent toxicity studies on early life stages of some species of freshwater mussels that have demonstrated adverse effects at concentrations close to or lower than the levels of copper allowed for by the current water quality criteria copper.

DEQ Recommendation: Before recommending changes to the copper criteria, DEQ is interested to see how EPA recommends using this type of toxicity data for juvenile freshwater mussels in their reassessment of the ammonia criteria. This will allow DEQ to address these issues in a consistent manner for both the ammonia and copper criteria. DEQ will also further investigate the new EPA biotic ligand model copper criteria in regards to this issue. DEQ expects to develop recommendations during the next Triennial Review regarding modification to the copper criteria.

3. **Cadmium (freshwater criteria):** The committee investigated revising Virginia's water quality criteria for cadmium in freshwater based on recommendations in either of two new review reports on cadmium toxicity and criteria that became available after the most recent EPA reassessment of their cadmium criteria in 2001. One proposal was developed in 2004 on behalf of the Association of Metropolitan Sewerage Agencies (AMSA) and the other was published in 2006 by the U.S. Geological Survey (USGS).

DEQ Recommendation: DEQ recommends proposing revised freshwater criteria for cadmium based on the USGS report titled; "Cadmium Risks to Freshwater Life: Derivation and Validation of Low-Effect Criteria Values Using Laboratory and Field Studies". This report is the most comprehensive and up-to-date reassessment of the toxicity data available for cadmium and incorporates the data included in the earlier EPA criteria document and the AMSA report. DEQ recommends using the genus mean acute value for the trout genus *Oncorhynchus* for setting the final acute value,

as opposed to the USGS recommendation of using the lowest species mean acute value for cutthroat trout which is an important species in other parts of the country. The resulting criteria is expected to be more stringent than the current Virginia criteria, but not as stringent as the EPA 2001 criteria.

4. **Cyanide (freshwater and saltwater criteria):** The committee investigated the potential for revising Virginia's water quality criteria for cyanide in both freshwater and saltwater based on a recent report; "Scientific Review of Cyanide Ecotoxicology and Evaluation of Ambient Water Quality Criteria: Final Report" (January 2007) produced on behalf of the Water Environment Research Foundation (WERF).

DEQ Recommendation for freshwater criteria: DEQ does not recommend changing the current freshwater criteria for cyanide based on the results of the WERF report because the potential changes to the criteria values are less than $\pm 8\%$ different from the current criteria values and these are not considered significant enough to warrant changing an established criteria.

DEQ Recommendation for saltwater criteria: DEQ does not recommend changing the current saltwater criteria for cyanide based on the results of the WERF report because of the reasons listed below:

- The WERF report proposed acute criterion is five times higher than the current acute criterion.
- Difference caused primarily by adding new toxicity data for crabs in the genus *Cancer*, mostly for Pacific Ocean crab species.
- All the added toxicity values for these crabs are greater than 12 times higher than the value for this genus originally established by EPA.
- EPA criteria guidelines call for extra scrutiny when toxicity values within a species or genus are greater than a factor of 10 to determine if some data should not be used in criteria calculations.
- Tests on crabs in the WERF study were conducted at temperatures below ASTM guidelines and EPA's original tests on Atlantic crab. Conducting tests at lower temperatures could result in higher LC₅₀ values than at higher temperatures and the disparity in temperatures means the new tests are not exactly comparable to the original EPA tests.
- The Pacific crab species appear to be less sensitive compared to the Atlantic species, raising questions of the appropriate use of these data for Virginia criteria
- The new efforts to recalculate the saltwater cyanide criteria focused exclusively on crabs in the genus *Cancer*, but this is not an important genus in Virginia waters.
- No data are available for the important blue crab or many other species important in Chesapeake Bay or the Atlantic coast. Lack of data for important species limits the level of confidence that a significantly higher criterion for cyanide would provide adequate protection.

5. **Lead (freshwater and saltwater criteria):** The committee investigated the proper conversion factor to apply to the Virginia aquatic life criteria for lead to convert the criteria concentrations to dissolved concentrations. Virginia recalculated the WQC for lead in 1998-1999 after literature review and using updated database and is different than EPA's 1985 lead WQC and the question was whether or not the conversion factor recommended for the EPA criteria for lead was also appropriate for Virginia's lead criteria.

DEQ Recommendation: DEQ recommends proposing the conversion factor recommended by EPA to the Virginia criteria for lead.

6. **Mixing Zone Prohibition for PBTs:** The committee reviewed the issue which involves the potential prohibition of mixing zones for persistent bioaccumulative substances for new or expanding dischargers.

This item encompasses several issues. First, what is a persistent bioaccumulative substance and second, should DEQ modify the WQS to eliminate mixing zones for these substances.

- Pollutants of concern - The consensus reached was that we were concerned with persistent, bioaccumulative toxic compounds; more specifically compounds that are toxic and are either persistent or bioaccumulative. There are various criteria in the literature for characterizing a substance as a PBT and various lists of PBTs available. In the end, the discussion centered on the water quality impairments we have in Virginia and the primary concern came down to the control of PCBs and Mercury.
- Impact of not allowing PCB or Mercury mixing zones for new and expanding facilities. DEQ has attempted to quantify the impact of such a policy on water quality as well as on VPDES and MS4 permits.

Water Quality – Significant progress has been made on only three TMDLs involving PCBs and Mercury in Virginia. In each of those TMDLs, the pollutant of concern has proven to be a legacy issue and not a significant ongoing source of contamination. The pollutant was introduced to the environment through careless handling or use of the material long before Virginia adopted a water quality standard for the substance and the impairment is not related to DEQ's allowance of a mixing zone. Remaining point sources of PCBs and Mercury in these three TMDLs make up 2% of the load or less (the one exception being PCBs picked up in Washington DC's CSO system which accounts for 8 % of the loading) so it is very doubtful that eliminating mixing zones for new or expanding discharges will have any measurable impact on water quality.

In an **impaired water** for which DEQ has a water column water quality criterion, a new or expanded discharger would have to demonstrate the discharge does not cause or contribute to the impairment. This in essence means that they would have to meet the WQC end-of-pipe (no mixing zone) now. In **Tier 1 waters** a permittee is allowed to use the entire remaining capacity in the receiving stream under current procedures; however staff is unaware of any situations where this has resulted in a significant increase in PCB or Mercury loading to the receiving stream. In **Tier 2 waters**, wasteload allocations for new or expanding facilities are currently limited to 10% of the remaining assimilative capacity for human health-based PBTs such as PCBs and Mercury.

VPDES and MS4 Permits – In the case of VPDES permits it is not clear what the impact of a mixing prohibition for PCBs and Mercury would be due to a lack of low level data. Only in the past couple of years has DEQ begun to require low level Mercury monitoring under EPA Method 1631. Prior monitoring has been performed using older methods with quantification levels that were often higher than the WQC. The data that has been obtained is generally contained in VPDES applications and TMDL documents and not retrievable with CEDS. EPA has just recently begun the approval process for a new low level analytical method for PCBs. The low level PCB data available to DEQ today is limited. The advanced treatment systems on the tidal Potomac are thought to provide greater than 99% removal of influent PCBs due to very low effluent TSS levels and the hydrophobic nature of PCBs.

It is worth noting further that under the EPA's *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion (January 2009)*, mixing zones and numerical water quality based effluent limits for Mercury will probably not be considered without site specific studies to develop bioaccumulation factors and corresponding water column criteria. This is not expected to be the case for a vast majority of situations. In the absence of site specific bioaccumulation factors to develop water column values, EPA recommends the use of Mercury Minimization Plans (MMPs) as the primary means of limiting Mercury discharges.

DEQ Recommendation: The staff recommends that an across the board prohibition of mixing zones for new and expanding dischargers of PCBs and Mercury not be proposed in the Water Quality Standards regulation at this time. This recommendation is based upon the relatively insignificant contribution of point sources to existing impairments for PCBs and Mercury as well as the unknown consequences on the permitting program due to the current lack of low level PCB and Mercury data.

Staff also recommends that the workgroup formed to address the Board's Antidegradation Policy implementation guidance also consider appropriate guidance for addressing PBT mixing zones and the implementation of the new Methyl Mercury fish tissue criterion.